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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/116,589	07/16/1998	SHINGO NISHIKAWA	Q51098	2728

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EXAMINER	
CHANG, AUDREY Y	
ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 09/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/116,589	NISHIKAWA ET AL.	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *28,29 and 64-66* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *28,29 and 64-66* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on July 21, 2005, which has been entered into the file.
- By this amendment, the applicant has amended claims 28, 29 and 65.
- Claims 28-29 and 64-66 remain pending in this application.
- The objections to claims 28-29 and 64-66 set forth in the previous Office Action are *withdrawn* in response to applicant's amendment.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 28 and 64-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Wreede et al (PN. 5,499,118) in view of the patents issued to Dausmann et al (PN. 5,825,514), Moss et al (PN. 5,016,953) and Weber (PN. 3,647,289).

Claim 28 has been amended which necessitates the new grounds of rejections.

Wreede et al teaches a system and method for copying *multiple holograms* to create a *hologram-recorded medium*, wherein the method comprises *stacking* a hologram-recording layer (35, Figure 1) on a first reflection master hologram (25). A first *reconstruction beam* (RB1) is illuminating the first reflection master hologram to create a first diffracted beam (DB1) wherein the first diffracted beam

interferes with the first reconstruct beam to create a first *interference fringes* corresponding to a *first hologram* recorded within the hologram recording layer. Wreede et al teaches that a *second reflection master hologram* (29) is also used such that a second *reconstruction* beam (RB2) illuminates the second reflection master hologram and creates a *second* diffracted beam (DB2) wherein the second diffracted beam interferes with the second reconstruction beam to create a *second interference fringes* corresponding to *a second hologram* recorded within the hologram recording layer, (please see Figure 1). The recorded holograms serves as the *plurality of holograms* that can arbitrarily assigned to or belong to a collection of pixels.

This reference has met all the limitations of the claims with the exception that it does not teach *explicitly* that the second reflection master hologram *replaces* the first mater hologram for recording the second hologram. However whether to utilize the step of "replacing" to record the first and second hologram one after the other or the step of having both master holograms present and recording the holograms simultaneously would achieve the same result, namely having both the first and second holograms recorded in the medium, and *in a sense the second master hologram does "replace" the first master hologram in reality when recording the second hologram*, such modification would therefore have been obvious to one skilled in the art for the benefit of recording them one at time as desired in some specific applications to allow more control for the recording process.

Wreede et al teaches that the hologram-recording layer includes *dichromated gelatin* (DCG), which is a *photosensitive materials*. **Claim 28 has been amended to include the phrase "a photosensitive material capable of recording a volume hologram".** Although this reference does not teach explicitly that the recorded of holograms are of *volume* type holograms, however it is well known in the art that a DCG material is a photosensitive material that is *capable of* recording *volume* type hologram. It would then have been obvious to one skilled in the art to record the hologram as volume type holograms for the benefit of making the holograms to achieve the best diffraction efficiency.

Wreede however also does not teach explicitly that the reflection master hologram is a *relief* hologram. However it is well known in the art that the *type* of master hologram used for copying holograms *do not effect* the recording process and the hologram formed. **Dausmann** et al in the same field of endeavor demonstrates to use a relief hologram as the master hologram for copying, (please see Figure 2, the relief hologram 11). Such modification would then have been obvious to one skilled in the art for the benefit of making the master hologram as a relief hologram which has its advantages of easily manufactured in an embossing process.

This reference also does not teach explicitly that the master holograms are computer-generated holograms. However computer generated holograms are extremely well known in the art and to use a computer-generated master hologram for copying hologram, as demonstrated by the teachings of **Moss** et al, is also extremely well known in the art. It would then have been obvious to one skilled in the art to modify the mater holograms of Wreede by making them computer generated holograms for the benefit of providing master holograms with accurately calculated fringes and hologram pattern for achieving good recording quality.

With regard to claim 64, although these references do not teach explicitly to use an electronic beam to create the computer generated hologram, such feature is either inherently met by the disclosure or would have been an obvious modification to one skilled in the art since electronic beam is a common beam source in the art for lithographically creating fine pattern such as hologram pattern. One skilled in the art would be motivated to create computer-generated hologram with electronic beam for the benefit of easy accessibility.

With regard to the feature of stacking the photosensitive material on a dichroic filter and stacking the dichroic filter on the reflection type relief hologram, this reference fails to teach such explicitly **Weber** in the same field of endeavor teaches to place a *multifilm dielectric optical filter* (23, Figure 2),

which attenuates radiation incident thereon depending upon its *wavelength*, which by definition is a *dichroic* filter, between the master hologram (11, serves as the relief hologram) and a copy detector (25) which serves as the *photosensitive material* in the process of copy-recording the hologram recorded in the master hologram (11) to the copy detector wherein the optical dichroic filter has the function of *blocking* the undiffracted light passing through the master hologram to reach the copy detector or photosensitive material to reduce the possible noise being recorded in the photosensitive material (25, please see column 4, line 45 to column 5, line 49). It would then have been obvious to one skilled in the art to apply the teachings of Weber to add an optical dichroic filter between the relief maser hologram and the photosensitive material to suppress unwanted diffraction (based on the wavelength selection) or undiffracted light reconstructed from the master hologram to enter the photosensitive material to prevent noise being recorded in the material. With regard claim 65, Weber teaches explicitly that for fabricating hologram that requires multiple or successive exposures of light of distinct wavelengths used in reconstructing the master hologram, different optical dichroic filter having different wavelength characteristics is needed at different exposure step, (please see column 5, line 30-35).

3. Claims 29 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Wreede et al (PN. 5,499,118) in view of the patents issued to Moss et al (PN. 5,016,953) and Weber (PN. 3,647,289).

Claim 29 has been amended which necessitates the new grounds of rejections.

Wreede et al teaches a system and method for copying *multiple holograms* to create a *hologram-recorded medium*, wherein the method comprises *stacking* a hologram-recording layer (135, Figure 2) on a *first transmission master hologram* (125). A first *reconstruction beam* (RB1) is illuminating the first transmission master hologram to create a first diffracted beam (DB1) wherein the first diffracted beam interferes with the first reconstruct beam, serves as the *reference light incidents on the photosensitive*

material, to create a first *interference fringes* corresponding to a *first hologram* recorded within the hologram recording layer. Wreede et al teaches that a *second transmission master hologram* (129) is also used such that a second *reconstruction* beam (RB2) illuminates the second transmission master hologram and creates a *second* diffracted beam (DB2) such that the second diffracted beam interferes with the second reconstruction beam, also serves as the reference beam incidents on the photosensitive material, to create a *second interference fringes* corresponding to *a second hologram* recorded within the hologram recording layer, (please see Figure 1). The recorded hologram serves as the *plurality of holograms* that can be arbitrarily assigned to a collection of pixels.

This reference has met all the limitations of the claims with the exception that it does not teach *explicitly* that the second transmission master hologram *replaces* the first mater hologram for recording the second hologram. However whether to utilize the step of "replacing" to record the first and second hologram one after the other or the step of having both master holograms present and recording the holograms simultaneously would achieve the same result, namely having both the first and second holograms recorded in the medium, and *in a sense the second master hologram does "replace" the first master hologram in reality when recording the second hologram*, such modification would have been obvious to one skilled in the art for the benefit of recording them one at time as desired and perhaps required in some specific applications to allow more control for the recording process.

Wreede et al teaches that the hologram-recording layer may include *dichromated gelatin* (DCG), which is a *photosensitive materials*. **Claim 29 has been amended to include the phrase "a photosensitive material capable of recording a volume hologram".** Although this reference does not teach explicitly that the recorded of holograms are of *volume* type holograms, however it is well known in the art that a DCG material is a photosensitive material that is *capable of* recording *volume* type hologram. It would then have been obvious to one skilled in the art to record the hologram as volume type holograms for the benefit of making the holograms to achieve the best diffraction efficiency.

Wreede does not teach explicitly that the master holograms are computer-generated holograms. However computer generated holograms are extremely well known in the art and to use computer-generated master hologram for copying hologram, as demonstrated by the teachings of **Moss** et al. It would then have been obvious to one skilled in the art to modify the mater holograms of Wreede by making them computer generated holograms for the benefit of providing master holograms with accurately calculated fringes and hologram pattern for achieving good recording quality.

With regard to the feature of stacking the photosensitive material on a dichroic filter and stacking the dichroic filter on the transmission type hologram, the Wreede reference also does not teach such explicitly. **Weber** in the same field of endeavor teaches to place a *multifilm dielectric optical filter* (23, Figure 2), which attenuates radiation incident thereon depending upon its *wavelength*, which by definition is a *dichroic* filter, between the *transmission type* master hologram (11, serves as the relief hologram) and a copy detector (25) which serves as the photosensitive material in the process of recording the hologram recorded in the master hologram (11) to the copy detector wherein the optical dichroic filter has the function of *blocking* the undiffracted light, (based on wavelength selection), passing through the master hologram to reach the copy detector or photosensitive material to reduce the possible noise being recorded in the photosensitive material (25, please see column 4, line 45 to column 5, line 49). Weber also teaches that an *independent reference beam,* which may be illuminated from the *opposite side* of the copy detector (25), as comparing to the side illuminated by the image carrying diffracted light from the maser hologram, is used to interfere with the diffracted light to record the hologram, (please see column 5, lines 35-46). It would then have been obvious to one skilled in the art to apply the teachings of **Weber** to add an optical dichroic filter between the transmission master hologram and the photosensitive material to suppress unwanted diffraction or undiffracted light reconstructed from the master hologram to enter the photosensitive material to prevent noise being recorded in the material. With regard to claim 66, Weber teaches explicitly that for fabricating hologram that requires multiple or successive exposures of light

with distinct wavelength used in reconstructing the master hologram, different optical dichroic filter having different wavelength characteristics is needed at different exposure step, (please see column 5, line 30-35).

Response to Arguments

4. Applicant's arguments filed on July 21, 2005 have been fully considered but they are not persuasive.

In response to applicant's arguments concerning the cited Weber reference teaches the optical filter (23) used to attenuate the incident light entering at a certain angle which is in contrast to the dichroic filter of the instant application such that high-order diffraction light is cut-off and the recording of unnecessary interference fringes is prevented, the examiner respectfully disagrees for the reasons stated below. **Firstly**, by using a dichroic filter which reflects light of certain wavelength and passes light of other wavelength WILL Not cut off higher order diffraction light, since the higher order diffracted light could be of the same wavelength that all may be passed by the dichroic filter and preventing them being recorded. The dichroic filter can *only* select the diffracted light with the selected wavelength to reach the photosensitive material and to be recorded in the material as hologram. This is exactly what happen in the Weber reference wherein Weber teaches explicitly that the multifilm dielectric optical filter (23) allows to attenuate radiation incident upon it depending upon *its wavelength*, (please see column 5, lines 11-20), which means that only the diffracted and undiffracted light of the *selected wavelength* are capable of filtering through to reach the hologram recording medium (25) to record the hologram (i.e. interference fringes) originally recorded in the mater hologram (11). The multifilm dielectric optical filter is known in the art to be a dichroic filter, (please see the explicit teachings of Vincent et al PN. 4, 870,268, column 1). This reference therefore meets the limitations concerning the dichroic filter.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent issued to **Vincent et al (PN. 4,870,268)** teaches that multilayer dielectric interference filter is known in the art as dichroic filter .

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Audrey Y. Chang, Ph.D.
Primary Examiner
Art Unit 2872

A. Chang, Ph.D.